

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

#7  
C. G. Gue  
4/9/02

In re the application of:

Wadood HAMAD et al ✓

Group Art Unit: 1774 ✓

Serial No: 09/522,359 ✓

Examiner: L.D. Ferguson ✓

Filed : March 9, 2000 ✓

For : ENGINEERED CRACK RESISTANT  
PAPER AND BOARD

REQUEST FOR RECONSIDERATION

Commissioner of Patents and Trademarks  
Washington, DC 20231

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TECHNOLOGY CENTER 1700

Sir:

Applicant respectfully requests reconsideration of the rejections set forth in the Office Action of January 24, 2002.

The invention is a cellulose fiber network having polymer impregnated into the network in geometric formations. These limitations are recited in independent claim 1. The polymer forms a discontinuous layer absorbed through the thickness of the sheet. The layers act as stress arresters, or locations of crack retardation, to improve the energy absorbing capacity of the treated sheet. The effect is improved fracture toughness and ductility of the sheet.

In the Office Action of January 24, 2002, the Examiner rejected claims 1 and 3-8 as being obvious over Caldwell in view of Conforti et al in view of Li et al. Caldwell discloses a method of continuously applying a shear-thin polymer to a fibrous or foam web. The polymer acts as a protective layer, presumably against water-resistance to achieve improved barrier properties. The polymer is applied to the surface of the web and the polymer is immediately shear-thinned to reduce viscosity. To aid in the absorption of the polymer by the web, the web is distorted to facilitate the entrance of the polymer composition into the web. This distortion is typically performed by stretching. The

Examiner relies upon Conforti et al for disclosing an abrasion-resistant coating and Li et al for a discontinuous polymer matrix.

The Examiner states that Caldwell discloses paper having a web made of fibers in the form of yarns or staples. This is not correct, as column 5, lines 29-40, referenced by the Examiner, indicate that the paper is not the web, but a backing for the web. The disclosure states that "any web that is too weak or elastomeric can be treated in accordance with the subject invention if it is laminated to a support backing of paper, film, such as Mylar, or the like and controllably stretched or not stretched prior to applying the backing". The method of applying the polymer to a web disclosed by Caldwell, including shear-thinning and web stretching, is inapplicable to cellulose fiber networks, such as paper.

Conforti et al discloses the development of a binary image having first areas with a porous or particulate image-forming substance adhered to a substrate and second areas where the substrate is free from the image-forming substances. The substrate is protected by laminating a barrier layer, a durable layer and a support layer with the barrier facing the image. The durable layer provides abrasion resistance, but the multi-layer coatings on the substrate are deposited above the substrate. There is no teaching or suggestion to combine an abrasion-resistant layer with the disclosure of Caldwell which provides the use of a barrier layer, not an abrasion layer, on a web.

Li et al discloses a method to optimize the packing efficiency of composites comprising continuous synthetic fibers embedded in a polymer matrix. The polymer is present throughout the web, as it is the polymer to fiber ratio that varies with thicker areas having greater resin content (see column 2, lines 47-56). The polymer is non-uniform, not discontinuous, as recited in claim 1 of the application. The disclosed method includes the layering, the continuous reinforcement and embedding matrix using a pre-preg process along with an indentation

cylinder. The indentation shapes pertain to how the polymer matrix is added to the reinforcement to result in an optimally produced composite. The process requires the indentation of the web. The process uses temperatures and pressures which would damage natural fibers, such as cellulose. There is no disclosure of a discontinuous polymer matrix increasing durability.

Moreover, Caldwell references silicone coatings, presumably to render clothing waterproof. At column 6, lines 51-53, Caldwell states that a "web treated by this invention can undergo a large number of machine washings with detergent without experiencing appreciable or significant change or deterioration". Caldwell's polymer matrix is a protective layer and to apply such a protective layer in a discontinuous manner would render it useless.

The Examiner rejected claims 1-2 as being unpatentable over Ungar et al in view of Conforti et al and Li et al. The Examiner stated that Ungar et al discloses a substrate of thermoplastic, thermosettable board and states that the sheet is analogous to paper. An ultra-thin abrasion resistant layer is coated on the surface. Ungar et al does not disclose the use of a polymer or a cellulose web. The Examiner states that Conforti et al discloses a paperboard material having an abrasion-resistant polymer material. The Examiner also relies upon Li et al for the disclosure of a discontinuous polymer film.

Both Ungar et al and Conforti et al disclose an abrasion-resistant-coating and not a polymer material impregnated into a cellulose fiber network web as is disclosed and claimed in the application. Also, the application of an abrasion-resistant coating in a discontinuous manner would render it useless. As argued previously, Li et al discloses a process requiring the indentation of the web and the continuous presence of polymer throughout a web, but in differing proportions. There is no motivation to combine the disclosure of Li et al with Ungar et al, as the resulting combination would be inoperative.

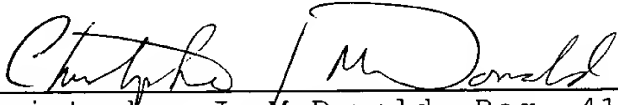
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no support

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The claims are allowable over the art of record and favorable action is eagerly and earnestly solicited. If any issues remain, and the Examiner believes a telephone conversation would resolve such issues, the Examiner is urged to contact the undersigned attorney.

Respectfully submitted,

by   
Christopher J. McDonald, Reg. 41,533

April 5, 2002

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